Marianne Francois—Scientific modeling of materials and climate

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With her eyes on the sky, Marianne François left pastoral Normandy in the French countryside to study flight. She landed in Florida, where she obtained her master’s of science in aerospace engineering at Embry-Riddle, the world's largest aviation university. She followed with doctoral studies at the University of Florida. Throughout college, she was inspired by research at one of the largest scientific institutions in the world: Los Alamos National Laboratory.

So, in 2002, François became a postdoc at the Lab, where she is now a deputy group leader. A pilot, she (somewhat) jokingly says she chose Los Alamos because it has an airport atop a mesa.

Fluid dynamics reveals answers to many physical processes

In the Lab's Theoretical Division, François helps lead the group that researches fluid dynamics and solid mechanics. Understanding how fluids flow and interact with their surroundings is important to daily life. Ocean currents, tornadoes, water vapor that an airplane or car encounters—even the flow of blood through the cardiovascular system—are all guided by fluid dynamics.

Additionally, François and her group study materials and climate modeling and create large-scale computational simulations. They couple advanced numerical methods with models to better understand physical processes such as turbulence, heat transfer, chemical reactions, phase change and plasma behavior.

Research supports nonproliferation efforts

This work is applied to nuclear weapons and reactor design and safety, combustion engine design, energy industries, materials fabrication, medicine and global climate science.

Her 2006 paper published in the Journal of Computational Physics revealing numerical methods for the modeling of interfacial flow with surface tension has been cited nearly 250 times.

Aim high, stay focused

A civil air patrol pilot, François also volunteers for search and rescue missions. On ground, she leads the aviation and aerospace workshop in the Expanding Your Horizons program that supports technical career development for girls.

She urges young women to dream big and believe in themselves. "Don't get discouraged by what others say. Stay focused. Seek opportunities to discover what you like and set intermediate and long-term goals," says François, a recipient of the Lab's 2014 Women Who Inspire awards.